



#07-03-16-004B: TPM System Overview, Diagnosing Tire Pressure Monitor System (TPM) Concerns and TPM Frequently Asked Questions (FAQ) - (Mar 26, 2009)



TPM System Overview, Diagnosing Tire Pressure Monitor System (TPM) Concerns and TPM Frequently Asked Questions (FAQ)

Subject:

Models:

2007 Buick Lucerne, Rainier
2006-2007 Cadillac DTS, Escalade Models
2007 Cadillac SRX
2006-2007 Chevrolet Avalanche, Impala, Monte Carlo, Suburban, Tahoe
2007 Chevrolet Equinox, Silverado, TrailBlazer
2006-2007 GMC Yukon Models
2007 GMC Acadia, Envoy, Sierra
2007 Pontiac Torrent
2007 Saturn AURA, OUTLOOK
2007-2009 Saab 9-7X
2008-2010 GM Passenger Cars and Trucks (including Saturn except ASTRA)
2008-2010 HUMMER H2, H3

Attention: The information found in this bulletin is designed to be a single source for the majority of questions you may have about the Tire Pressure Monitoring (TPM) Systems found on General Motors Vehicles. While comprehensive, the bulletin is divided into sections, so after reviewing the whole document, you can reference just the section you need when further questions arise. A copy of this information may also be given to your customer as the "FAQs" section is written to assist you in explaining the most common misconceptions about the system in an easy to understand way. This bulletin does not apply to the Saturn Astra and does not apply to vehicles in Canada that are not equipped with Tire Pressure Monitoring.

This bulletin is being revised to add the 2010 model year. Please discard Corporate Bulletin Number 07-03-16-004A (Section 03 - Suspension).

Customer Concerns and Confusion

When a customer comments on a condition related to tire pressure monitoring, it is very important to distinguish between *Check Tire Pressure / Low Tire Pressure* conditions and *Service Tire Monitor* system issues. Understanding the difference between the two distinct conditions will help you distinguish between normal system operation (tire needs air) and a system malfunction.

There are two important differences between a *Check Tire Pressure / Low Tire Pressure* message/light and a *Service Tire Monitor* message light:

- A *Check Tire Pressure / Low Tire Pressure* message/light will stay on solid and no system codes are set. The TPM system is operating as designed. Correcting the tire pressure will resolve the issue.
- A *Service Tire Monitor* message/light will blink and system codes WILL set. There is a condition that should be diagnosed and corrected.

Tire Pressure Light



Service Tire Monitor System (light blinks, then stays on)

The Tire Pressure Light will blink for about one minute and a *Service Tire Monitor* message will be displayed when a system malfunction occurs. For example: If one or more tire pressure sensors does not transmit information for 18 minutes of driving, the TPM system WILL set a code, display a message, and BLINK the light for about a minute, after which the light will stay on solid for the remainder of the ignition cycle. If the system fault is intermittent, the message/light may also be intermittent - on during some ignition cycles, off during others.

Low Tire Pressure Warning (light stays on solid)

If the TPM system detects a tire pressure below the threshold, the *Check Tire Pressure* message and the Tire Pressure Light will come on and stay on. The message and light may be intermittent in nature, especially during cold weather.

Conditions That Will Cause the Low Tire Pressure Warning Message/Light to Display:

- The tire may have picked up a road hazard and/or have a slow leak.
- The tire pressure may not have been checked in the past six months.
- The air pressure in a cold tire may be at the pressure where the system is required to warn the driver. However, that same tire will rise in temperature and pressure as the customer drives, causing the message and light to go out.
- The tires may have been rotated, pressures adjusted, and the new tire positions were NOT re-learned into the vehicle. This can occur on vehicles that have two different placard pressures for front and rear tires.
- There may be a slow leak in one of the wheel and tire assemblies (Valve Stem, Wheel Rim, or Aluminum Wheel Porosity Leak). If this condition is found, please refer to bulletin:
 - #05-03-10-003B - *Low Tire Pressure, Leaking Cast Aluminum Wheels (Repair with Adhesive Sealant)*
 - #04-03-10-001C - *Info - Tire Puncture Repair Procedures for all Cars and Light Duty Trucks*

The Effect of Outside Temperatures on Tire Pressures

Important: As a rule of thumb, tire pressure will change about 7 kPa (1 psi) for every 6°C (10°F) decrease in temperature - dropping when it gets colder outside, rising when it gets warmer.

Tire pressure should be set to the specified placard pressure at the lowest seasonal temperature the vehicle will encounter during operation.

The correct action to avoid a *Check Tire Pressure* message due to extreme temperature changes is to do the following:

- Use an accurate, high quality tire pressure gauge.
- Re-learn the TPM sensors and adjust the tire pressure to the placard values after every tire rotation.
- Let the vehicle sit and adjust the tire pressure to the specified value when the tire temperature is at the lowest expected temperature.
- Never set the tire pressure below the placard value regardless of tire temperature or ambient temperature.

Important: *On extremely cold days, if setting the tire pressure when the vehicle has been indoors, it may be necessary to compensate for the low outside temperature by adding 21-27 kPa (3-4 psi) more than the placard pressure. At some later time, when convenient and when the tires are cold (outdoors), the pressure should be re-checked and adjusted to the placard pressures if necessary.*

Using the TPM Tool

TPM Tool J 46079 Software Updates and Hardware Update Kit

The J 46079 TPM tool is a valuable aid in diagnosing system faults with TPM systems. It is a software-driven tool that **REQUIRES** periodic updates in order to work on new model cars and trucks. Failure to update the tool with the latest software version may result in possible misdiagnosis.

TPM Software Version 3.5 has recently been shipped to each GM dealership in the J 46079-30 TPM update kit. All future TPM software updates will be posted in GM DealerWorld (U.S) or the GMinfoNET (Canada) as needed. Under the Support tab, access "TPM Downloads."

This update consists of two parts:

- A hardware update kit that consists of a custom rechargeable battery pack, battery cover with charging terminals, and a charging cradle with a smart charger where the whole tool will fit into the cradle for charging (same concept as a cordless phone). This hardware update substantially increases the life of the batteries and will assure that the TPM Tester always has full battery capacity.
- The software update will add new vehicles and also improve the speed of the tool's read-back ability and accuracy.

Sensor transmission signal strength is displayed in the upper left corner of the main display next to the tool's battery level display. When the tool is used in both activate

or scan mode, it will receive the sensor's transmission and indicate its signal strength. It is important to note the sensor's transmission signal strength since it is a good indication of an accurate diagnostic.

TPM Tool J 46079 User Tips



Diagnostic Tip

The placement of the TPM Tester's antenna when activating a sensor is critical, especially with the latest software update. When activating a sensor, the antenna tip of the TPM Test J 46079 must be placed on the sidewall, perpendicular to the tire, and close to the valve stem (see photo above). This will assure proper activation of the sensor. If the antenna of the TPM Tester is placed either on the valve stem or on the wheel itself, the tool may not properly activate the sensor, causing improper diagnosis.

Diagnostic Tip

If you encounter a sensor that does not respond when activated by the tool, try activating another sensor that responded previously. This will help you determine if the tool is able to activate the sensor or if you have a problem with one particular sensor.

Diagnostic Tip

When using the tool during a sensor learn procedure, use the "Activate" soft key on the tool. Press the key for one second then release and the tool will perform an LF (low frequency - 125 kHz) activation cycle. *You do not have to hold the key until the vehicle acknowledges.* Holding the key will just reduce battery life. The LF activation

of the sensors wakes them up and forces them to transmit their IDs immediately. This allows a much shorter sensor learn procedure than using the Delta P method.

TPM Frequently Asked Questions (FAQs)

The following are some of the most asked questions:

Q: What is a Tire Pressure Monitoring System?

A: The TPM system consists of four sensors (one in each wheel), which transmit wireless (RF) signals to a vehicle receiver (typically, the same receiver that performs the keyless entry function), the Low Tire telltale, and the Driver Information Center (if equipped).

Q: Do all Vehicles Have Tire Pressure Monitoring?

A: Starting with the 2008 MY, all GM vehicles sold in the United States are equipped with tire pressure monitoring, to meet the mandates of FMVSS 138. Some vehicles built prior to the 2008 model year or sold in Canada have tire pressure monitoring; check vehicle build and RPO information to be sure.

Q: What does the Low Tire Telltale Look Like?



A: The Low Tire telltale is a yellow telltale that looks like an exclamation point inside of a horseshoe:

Q: When does the Low Tire Telltale Come On?

A: The Low Tire telltale MUST come on when a tire's pressure drops to 75% of the Recommended Cold Inflation pressure (the pressure value printed on the vehicle placard - the yellow and white sticker in the driver door opening.)

There are several events that may cause a Low Tire warning:

- The tire may have picked up a road hazard and/or have a slow leak.
- The tire pressure may not have been checked in the past six months.
- The air pressure in a cold tire may be at the pressure where the system is required to warn the driver. However, that same tire will rise in temperature and pressure as the customer drives, causing the message and light to go out.
- On vehicles where a different placard pressure is required between the front and the rear axles, the tires may have been rotated, pressures adjusted, and the new tire positions were NOT re-learned into the vehicle.
- There may be a slow leak in one of the wheel and tire assemblies (Valve Stem, Wheel Rim, or Aluminum Wheel Porosity Leak). If this condition is found, please refer to bulletin:
 - *#05-03-10-003B - Low Tire Pressure, Leaking Cast Aluminum Wheels (Repair with Adhesive Sealant)*
 - *#04-03-10-001C - Info - Tire Puncture Repair Procedures for all Cars and Light Duty Trucks*

Q: What does the TPMS Malfunction Warning Look Like?

A: The TPMS Malfunction indicator uses the same telltale as the Low Tire warning. The telltale will flash for the first 60 seconds of a KEY ON event, and then go on solid.

Q: How can I tell the difference between a Low Tire and a system malfunction?

A:

- A Low Tire telltale will be on solid immediately after KEY ON, and will be accompanied by a CHECK TIRE PRESSURE message in the Driver Information Center (if equipped).
- A system malfunction causes the telltale to flash for the first 60 seconds of a KEY ON event, and then go solid.

Tip

These behaviors repeat at each KEY ON cycle. The best way to diagnose the vehicle

(if you're not sure which warning is being displayed) is to KEY OFF and KEY ON again while watching the telltale and DIC messages.

Q: When are Diagnostic Trouble Codes Reported?

A: DTC's are reported ONLY when there is a system malfunction (flashing telltale). When a Low Tire (solid telltale) is displayed, that means that the system is working exactly as it's designed to do - since there's no malfunction, there is no need for a DTC.

Q: What service is needed if the Low Tire telltale is on?

A: When a vehicle comes in with a Low Tire warning, the tires should be checked for any leaks or damage (from road hazards). After those have been repaired (or if none are found), the tires should be inflated to the pressure shown on the Vehicle Placard - the yellow and white sticker in the driver door opening. It is *not necessary* to relearn the sensors after correcting the pressure.

Q: Can Tire Pressure Monitoring be turned off?

A: Tire Pressure Monitoring is now a mandated safety system in the United States and cannot knowingly be disabled by an OEM nor an aftermarket service provider (49 USC 30101).

Q: Can the Tire Type and/or Placard Value be changed, if aftermarket tires or wheels are installed?

A: The Tire Type (P Metric, LT Load Range C/D/E) and the Placard Value (Front Placard and Rear Placard, individually) are stored in the receiver as calibrations and CAN be revised at a GM Dealership with a Tech 2. (The RCDLR Setup screens allow this.) Since the under-inflation threshold is calculated as a percentage of the placard; correcting the placard values when different tires are installed will bring the vehicle back into compliance.

Q: What is Sensor Learning (Sensor Re-Learning, Sensor Training, Sensor Matching)?

A: Each sensor has its own unique identification code (ID) that is transmitted as part of its wireless signal. The receiver stores and uses these IDs to determine which sensors are installed on the vehicle, and in which corner of the vehicle the sensor resides in (so that both the pressure information provided in the Driver Information Center and the diagnostics are correct). Sensor Learning is the process that puts sensor ID information into the receiver.

Q: When is Sensor Learning required?

A: Sensor Learning should be done when the vehicle's tires are rotated (since sensor position on the vehicle has changed) or when a sensor is replaced/a new sensor is

installed (since a new ID has been introduced to the vehicle). Sensor Learning is *not required* when simply correcting the tire pressure resolves the vehicle problem.

Q: Why are dashes (" - -"), or a pressure value of 148 PSI (1020 kPa), sometimes displayed after a battery disconnect?

A: These displays come up after a battery disconnect/reconnect because the system is waiting for updated pressure information to be sent from the tire pressure sensors. As each sensor transmits its information, the display is updated appropriately. Note that when dashes or 148 PSI (1020 kPa) are displayed after a battery disconnect/reconnect, the System Malfunction warning is NOT displayed - because the system is still working properly, and simply waiting for updated information from the sensors. Driving the vehicle above 20 mph (32 km/h) for 2 minutes gets the sensors talking, and restores the correct pressure values to the display. It is also possible to restore the values by using the J-46079 TPM tool, using the "Activate" function at each tire to activate the sensor (it is NOT necessary to put the system into Learn mode, in this special case).

Q: Is there a sensor installed in the spare tire?

A: No - a sensor is not installed in the spare tire.

Q: Are all of the sensors the same?

A: All of the sensors are not the same. They are supplied by different manufacturers, and send different RF signals to the vehicle. SOME of the sensors are interchangeable, though - while they may look different, they DO send the same RF signal to the vehicle and MAY be used in place of one another on a vehicle. See the Sensor Information Guide for more details about which parts are interchangeable.

Q: What size is the sensor nut?

A: The sensor uses an 11 mm hex nut for attachment.

Q: Will a tire pressure sensor fit in every wheel?

A: GM wheels (including Accessory Wheels available from GM SPO) are designed to accommodate tire pressure sensors. Many aftermarket wheels also accommodate tire pressure sensors, but not all do. In some, the valve stem hole is placed in such a way (pointing straight into the middle of the wheel, for example) that the motion detection components inside the sensor will not work correctly.

Q: Can the valve core be replaced?

A: The valve core can and should be replaced if it is removed from the sensor, but the replacement part depends on the material of the valve stem (Refer to Service Bulletin # 08-03-10-005).. Sensors with a rubber valve stem may use a standard brass valve core for replacement. Sensors with an aluminum valve stem CANNOT use a brass core; instead, they require a nickel-plated valve core to protect against the

corrosion that forms when dissimilar metals come in contact. See the service parts guide for the correct GM part numbers to order and use.

Q: Can the grommet (and washer) be replaced?

A: The grommet (and washer) can and should be replaced if the sensor is removed from the wheel. The rubber grommet provides the air seal in the valve stem opening, and a new one should be used to ensure a fresh seal after each service. See the service parts guide for the correct GM part numbers to order and use.

Q: Can the rubber valve stem be replaced by itself?

A: The rubber valve stem is attached to the sensor electronics by a TORX screw. The valve can and should be replaced whenever the sensor is removed from the wheel. See the service parts guide for the correct GM part numbers to use.

Q: Can the sensor be cleaned with a sharp pin?

A: NEVER use a sharp object to clean the pressure port of the sensor; it can be damaged and lead to part failure. If the dirt/grime/obstruction cannot be removed with a cloth, replace the sensor.

Q: How long will the sensor's battery work?

A: The sensor is designed to last for 10 years or 150,000 miles (240,000 kilometers).

Q: Are tire pressure sensors compatible with aftermarket tire sealants?

A: Tire pressure sensors are not compatible with commercially-available tire sealants. Tire sealant materials can clog the pressure port of the sensor, and lead to inaccurate pressure readings and improper Low Tire warnings. Additionally, some sealant products use materials that can degrade the protective potting material that covers the sensor's electronics.

Q: Are tire pressure sensors compatible with GM Inflator Kits?

A: While tire pressure sensors are NOT compatible with commercially-available sealants, they HAVE been tested and ARE compatible with GM Inflator Kits and the sealant that they use. After inflator kit use, the sensor should be inspected for any damage, and replaced/cleaned as needed.

Q: Are tire pressure sensors compatible with nitrogen inflation?

A: Tire pressure sensors are compatible with nitrogen inflation (normal air is already 78% nitrogen).

Q: How do changing outside temperatures affect tire pressure?

A: All gases change pressure as their temperature changes, and air or nitrogen are no exceptions. A good rule of thumb is that tire pressure will change by about 1 psi (7 kPa) when temperature changes by 10° F (6°C). Customers may experience this as temperatures change from summer to fall and into winter - tire pressures will drop as the outside temperature gets colder. Customers may also experience this as temperatures change between mid-day and overnight.

Q: How should tire pressures be set at PDI?

A: Tire pressure should be set to the specified placard pressure at the lowest seasonal temperature the vehicle will see during operation. The correct action to avoid a CHECK TIRE PRESSURE message due to extreme temperature changes is to: Use an accurate high quality tire pressure gauge. Let the vehicle sit and adjust tire pressure to the specified value when tire temperature is at the lowest expected temperature. Never set tire pressure below the placard value regardless of tire temperature or ambient temperature. On extremely cold days, if setting tire pressure when the vehicle has been indoors, it may be necessary to compensate for the low external temperature by adding 3-4 psi (21-27 kPa) more than the placard pressure. When convenient, at some later time, when the tires are cold (outdoors), the pressure should be re-checked and adjusted to placard if necessary.

Q: When will the J-46079 tool be updated?

A: TPM Software Version 3.5 has recently been shipped to each GM dealership in the J 46079-30 TPM update kit. This update consists of two parts:

- A hardware update kit which consists of a custom rechargeable battery pack, battery cover with charging terminals, and a charging cradle with a smart charger where the whole tool will fit into the cradle for charging (same concept as a cordless phone). This hardware update substantially increases the life of the batteries and will assure that the TPM Tester always has full battery capacity.
- The software update will add new vehicles and also improve the speed of the tool's read-back ability and accuracy. Sensor transmission signal strength is displayed in the upper left corner of the main display next to the tool's battery level display. When the tool is used in both activate or scan mode, it will receive the sensor's transmission and indicate its signal strength. It is important to note the sensor's transmission signal strength since it is a good indication of an accurate diagnostic.

Q: Where should the J-46079 tool be positioned when it is being used?

A: Tool User Tip: The placement of the TPM Tester's antenna when activating a sensor is critical, especially with the latest software update. When activating a sensor, the antenna tip of the TPM Test J 46079 must be placed on the sidewall, perpendicular to the tire, and close to the valve stem. This will assure proper activation of the sensor. If the antenna of the TPM Tester is placed either on the valve stem or on the wheel itself, the tool may not properly activate the sensor, causing improper diagnosis.

Warranty Information

GM is very concerned about customer safety and tire performance. Anytime a customer brings a GM vehicle in for a tire or tire pressure monitoring concern, we encourage our dealers to perform a complete check of tire conditions, pressures, and the TPM system if necessary. Under normal circumstances, the condition of tires, TPM reprogramming during tire rotation, road hazard repairs, and checking/maintaining tire pressure are the responsibility of the vehicle owner. GM Dealers should encourage customers to inspect/check and maintain their tires and tire pressure on a regular monthly basis.

The tires and the tire pressure monitoring system are covered by the vehicle bumper to bumper warranty for manufacturing defects. It is GM's responsibility to perform repairs when a defect exists. If no defect exists, the customer should be responsible for the tire/system check.

GM does not cover the normal inspection and maintenance of tires and tire pressure. The use of this labor operation E0716 is intended to identify system defects and verify proper operation.

Warranty Information (excluding Saab U.S. Models)

E0716 -- Diagnostic System Check - Tire Pressure Monitoring This labor operation should be used to check proper TPM system operation when a customer brings their vehicle into the dealership with a *Service Tire Monitor System* message/light (blinks on startup, codes in system).

If a customer comments on a Check Tire Pressure / Low Tire Pressure message/light (light was on steady - no flashing), the tires should simply be inflated to the proper pressure - this is not a warrantable repair.

E0719 -- Washer, Lower Tire Pressure Warning Sensor Replacement This labor operation should be used whenever the rubber grommet is replaced.

E0722 -- Tire Pressure Indicator Sensor Replacement This labor operation should only be used when a System Malfunction has been confirmed (by labor operation E0716) and the Diagnostic Trouble Code (DTC) corresponds to a Sensor Fault (DTCs C0750, C0755, C0760 and C0765).

For vehicles repaired under warranty, use:

Labor Operation	Description	Labor Time
E0716	Diagnostic System Check - Tire Pressure Monitoring	Use Published Labor Operation Time

Warranty Information (Saab U.S. Models)

For vehicles repaired under warranty, use:

Labor Operation	Description	Failed Object	Fault/Reason	Location Code	Warranty Type	Repair/Action Code	Labor Time
3837501	Diagnostic System Check - Tire Pressure Monitoring	38375	67	0	01	08	Use Published Labor Operation Time

GM bulletins are intended for use by professional technicians, NOT a "do-it-yourselfer". They are written to inform these technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, DO NOT assume that the bulletin applies to your vehicle, or that your vehicle will have that condition. See your GM dealer for information on whether your vehicle may benefit from the information.



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